

Development of an Alternative for the External Means of Initiation for Hazard Classification of Rocket Motors



Weapons Division

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Purpose

- **Rewrite of TB 700-2 requires**
 - **Single Package Test**
 - Sympathetic Reaction Test if expected outside reactions
- **Large Diameter Rocket Motors**
 - Not transported or stored in stack configuration
 - **Alternate Test Used**
 - Super Large Scale Gap Test



Background

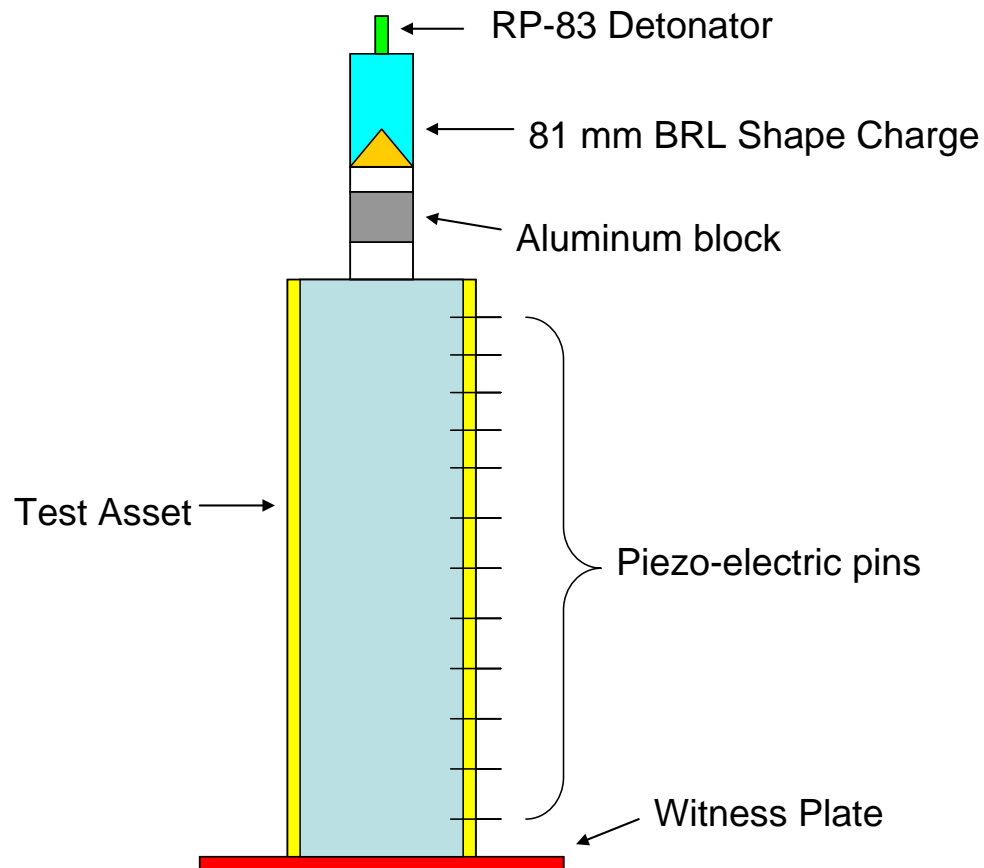
- **Harmonization of IM and HC**
 - **Shape Charge Threat**
- **New Alternate proposed in 2008**
DDESB seminar
 - **Super Large Scale Gap Test with 81mm Shape Charge stimulus**



Test Configuration

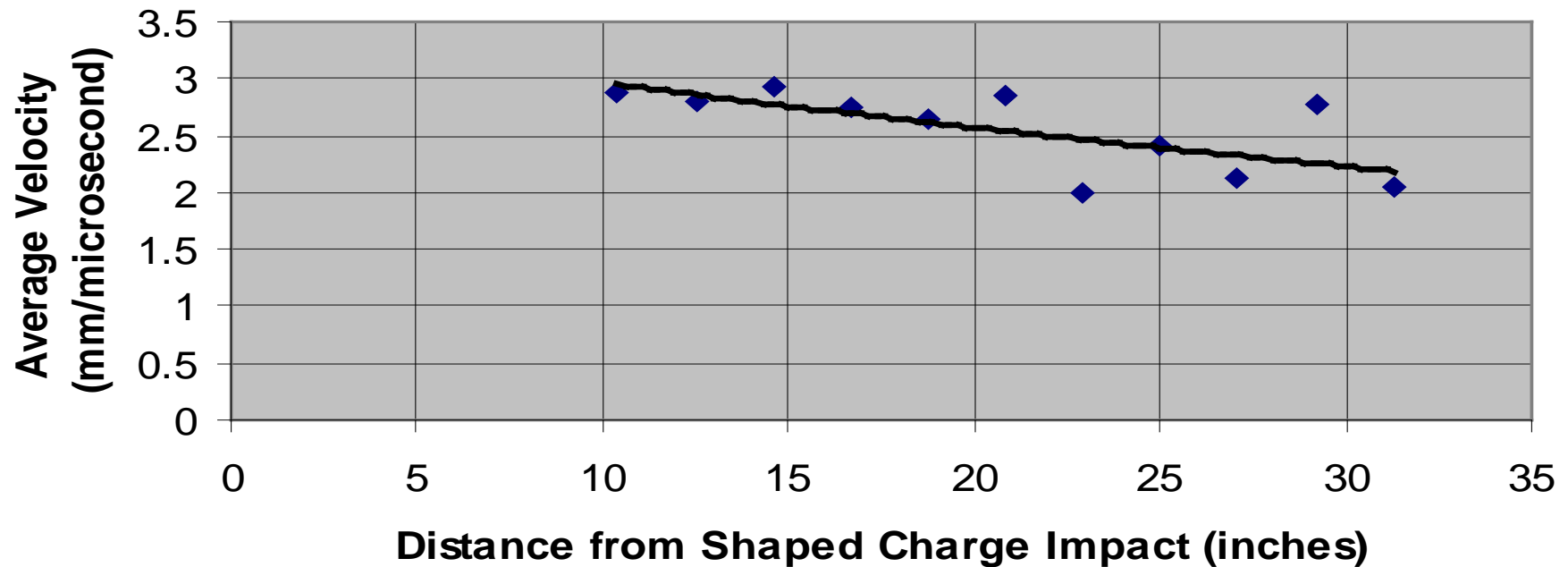


Vertical Configuration



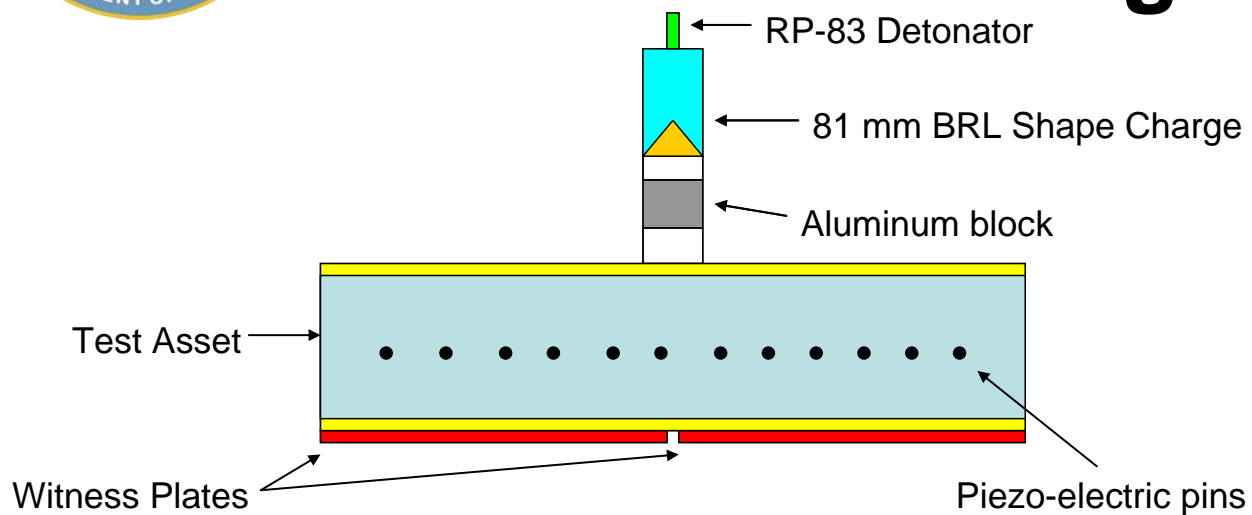


Example of Shock Velocity





Horizontal Configuration





Samples



Samples

- **HD 1.1**
 - PBXN-109 – HTPB/RDX/AI
 - Critical Diameter less than 2.54 cm
- **HD 1.3**
 - AP/HTPB/AI
 - Critical Diameter > 213 cm



Test Configuration

- **6 Tests performed**
 - **4 - PBXN-109**
 - **Vertical Orientation**
 - Steel
 - PVC
 - **Horizontal Orientation**
 - **2 - HD 1.3 Propellant**
 - **Vertical Orientation**



Results



HD 1.1 Steel Confinement Movie

Photron

100000 fps

Manual 559139

FASTCAM SA1.1 model ...

1/100000 sec

frame : 99997

192 x 192

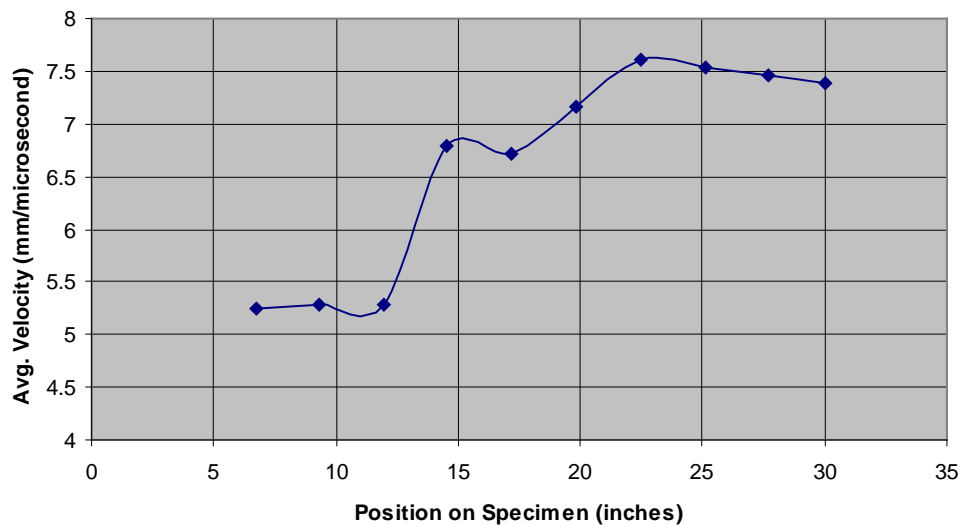
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HD 1.1 Vertical Configuration

SN-B6-0061





HD 1.1 Horizontal Configuration

Photron

FASTCAM SA1.1 model ...

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1/100000 sec

192 x 192

Manual 559139

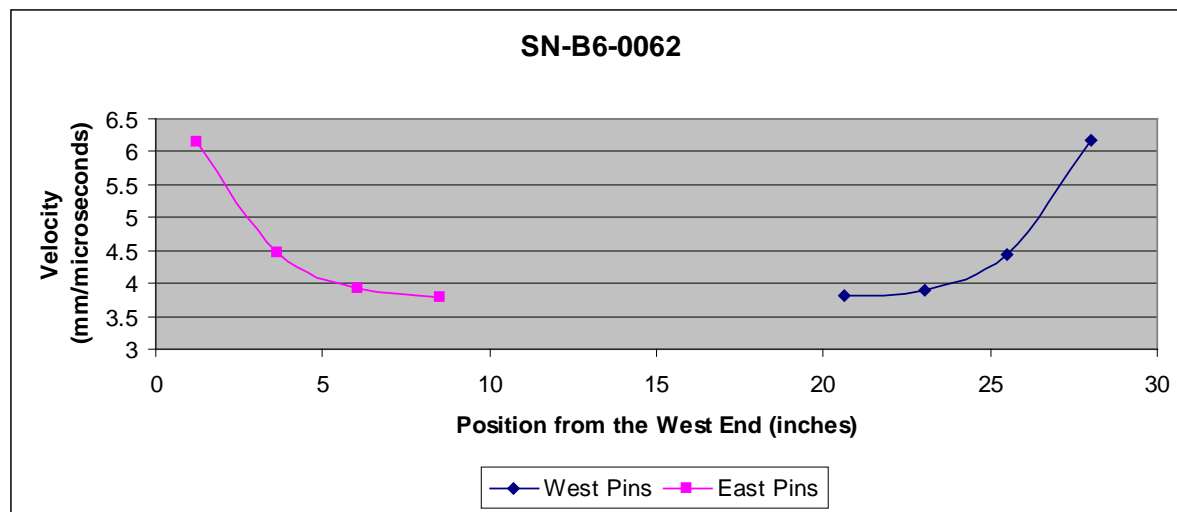
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HD 1.1 Horizontal Configuration





HD 1.3 Vertical Configuration

Photron

FASTCAM SA1.1 model ...

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1/100000 sec

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Manual 62127

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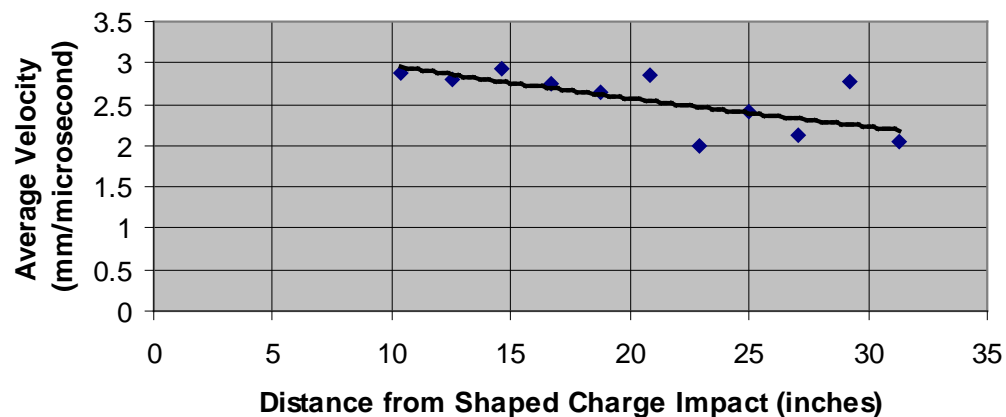
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HD 1.3 Vertical Configuration

SN-B6-0065





Summarized Results

	1	2	3	4	5	6
Orientation	Vertical	Horizontal	Vertical	Horizontal	Vertical	Vertical
Energetic Material	PBXN-109	PBXN-109	PBXN-109	PBXN-109	1.3 Propellant	1.3 Propellant
Case Material	Steel	Steel	Plastic	Plastic	Steel	Plastic
Pins: Go/No Go	Go	Go	Go	N/A	No Go	N/A
Witness Go/No Go	Go	Go	Go	No Go	No Go	No Go



Conclusions

- **Differentiate between HD 1.1 and HD 1.3 in vertical configuration**
 - HD 1.3 Large critical diameter
 - Did not detonate
- **Confinement effect in horizontal configuration – PBXN-109**



Future Work

- **Continue Populating Database**
 - HD 1.1, 1.2.X, and 1.3
- **Refinement of Horizontal Configuration**
 - Witness Plates to sides of item
 - Different Velocity technique
 - Crush Bar



Extra Slides



Pin Mixer Data

